

WHAT IS CLAIMED IS:

1 1. For use in a system capable of creating visual summaries
2 of video material, an apparatus for creating a compact visual
3 summary of video material, said apparatus comprising:

4 a visual summary controller capable of receiving keyframes of
5 said video material;

6 wherein said visual summary controller is capable of
7 extracting frame signatures from said keyframes, and capable of
8 using said frame signatures to create superhistograms from said
9 keyframes, and capable of using said frame signatures and said
10 superhistograms to create a compact visual summary of said video
11 material.

1 2. The apparatus as claimed in Claim 1 wherein said visual
2 summary controller is capable of filtering said keyframes and
3 extracting frame signatures from said filtered keyframes before
4 using said frame signatures to create said superhistograms to
5 create a compact visual summary of said video material.

1 3. The apparatus as claimed in Claim 2 wherein said visual
2 summary controller is capable of creating said compact visual
3 summary of said video material by using said superhistograms to
4 cluster said filtered keyframes, and by adding a representative

5 keyframe from said clustered keyframes to said compact visual
6 summary of said video material.

1 4. The apparatus as claimed in Claim 2 wherein said frame
2 signature is a histogram.

1 5. The apparatus as claimed in Claim 3 wherein the distance
2 measure for clustering is equal to a histogram difference
3 calculated by one of: L1 distance measure method, L2 distance
4 measure method, histogram intersection method, Chi Square test
5 method, and bin-wise histogram intersection method.

1 6. The apparatus as claimed in Claim 3 wherein said visual
2 summary controller is capable of selecting a representative image
3 for each of said superhistograms, wherein said representative image
4 is one of: the first image in each family histogram, the most
5 meaningful image in each superhistogram, a randomly chosen image,
6 and an image that is closest to the cluster center.

1 7. The apparatus as claimed in Claim 5 wherein said visual
2 summary controller is capable of selecting a family histogram to
3 use to create said compact visual summary of said video material.

1 8. The apparatus as claimed in Claim 1 wherein said visual
2 summary controller further comprises:

3 a visual summary retrieval module capable of retrieving a
4 compact visual summary stored in a memory unit and causing said
5 compact visual summary to be displayed in response to a user
6 request.

1 9. The apparatus as claimed in Claim 3 wherein said visual
2 summary controller is capable of using said compact visual summary
3 to access at least one portion of said video material.

1 10. The apparatus as claimed in Claim 3 wherein said visual
2 summary controller is capable of using said compact visual summary
3 to create new video material.

11. A system capable of creating visual summaries of video material, said system comprising an apparatus for creating a compact visual summary of video material, said apparatus comprising:

a visual summary controller capable of receiving keyframes of said video material;

wherein said visual summary controller is capable of extracting frame signatures from said keyframes, and capable of using said frame signatures to create superhistograms from said keyframes, and capable of using said frame signatures and said superhistograms to create a compact visual summary of said video material.

12. The system as claimed in Claim 11 wherein said visual summary controller is capable of filtering said keyframes and extracting frame signatures from said filtered keyframes before using said frame signatures to create said superhistograms to create a compact visual summary of said video material.

13. The system as claimed in Claim 12 wherein said visual summary controller is capable of creating said compact visual summary of said video material by using said superhistograms to

4 cluster said filtered keyframes, and by adding a representative
5 keyframe from said clustered keyframes to said compact visual
6 summary of said video material.

1 14. The system as claimed in Claim 12 wherein said frame
2 signature is a histogram.

1 15. The system as claimed in Claim 13 wherein the distance
2 measure for clustering is equal to a histogram difference
3 calculated by one of: L1 distance measure method, L2 distance
4 measure method, histogram intersection method, Chi Square test
5 method, and bin-wise histogram intersection method.

1 16. The system as claimed in Claim 13 wherein said visual
2 summary controller is capable of selecting a representative image
3 for each of said superhistograms, wherein said representative image
4 is one of: the first image in each family histogram, the most
5 meaningful image in each superhistogram, a randomly chosen image,
6 and an image that is closest to the cluster center.

1 17. The system as claimed in Claim 16 wherein said visual
2 summary controller is capable of selecting a family histogram to
3 use to create said compact visual summary of said video material.

1 18. The system as claimed in Claim 11 wherein said visual
2 summary controller further comprises:

3 a visual summary retrieval module capable of retrieving a
4 compact visual summary stored in a memory unit and causing said
5 compact visual summary to be displayed in response to a user
6 request.

1 19. The system as claimed in Claim 13 wherein said visual
2 summary controller is capable of using said compact visual summary
3 to access at least one portion of said video material.

1 20. The system as claimed in Claim 13 wherein said visual
2 summary controller is capable of using said compact visual summary
3 to create new video material.

1 21. For use in a system capable of creating visual summaries
2 of video material, a method for creating a compact visual summary
3 of video material, said method comprising the steps of:

4 receiving in a visual summary controller keyframes of said
5 video material;

6 extracting frame signatures from said keyframes;

7 using said frame signatures to create superhistograms from
8 said keyframes; and

9 using said frame signatures and said superhistograms to create
10 a compact visual summary of said video material.

1 22. The method as claimed in Claim 21 further comprising the
2 steps of:

3 filtering said keyframes received in said visual summary
4 controller; and

5 extracting frame signatures from said filtered keyframes
6 before using said frame signatures to create said superhistograms
7 to create a compact visual summary of said video material.

1 23. The method as claimed in Claim 22 further comprising the
2 steps of:

3 using said histograms to cluster said filtered keyframes; and
4 adding a representative keyframe from said clustered keyframes
5 to said compact visual summary of said video material.

1 24. The method as claimed in Claim 23 wherein the distance
2 measure for clustering is equal to a histogram difference
3 calculated by one of: L1 distance measure method, L2 distance
4 measure method, histogram intersection method, Chi Square test
5 method, and bin-wise histogram intersection method.

1 25. The method as claimed in Claim 23 wherein said visual
2 summary controller is capable of selecting a representative image
3 for each of said superhistograms, wherein said representative image
4 is one of: the first image in each family histogram, the most
5 meaningful image in each superhistogram, a randomly chosen image,
6 and an image that is closest to the cluster center.

1 26. The method as claimed in Claim 23 further comprising the
2 step of:
3 selecting a family histogram to use to create said compact
4 visual summary of said video material.

1 27. The method as claimed in Claim 23 further comprising the
2 steps of:
3 retrieving a compact visual summary stored in a memory unit;
4 and
5 causing said compact visual summary to be displayed in
6 response to a user request.

1 28. The method as claimed in Claim 23 further comprising the
2 step of:
3 causing said visual summary controller to use said compact
4 visual summary to access at least one portion of said video
5 material.

1 29. The method as claimed in Claim 23 further comprising the
2 step of:
3 causing said visual summary controller to use said compact
4 visual summary to create new video material.

1 30. For use in a system capable of creating visual summaries
2 of video material, computer-executable instructions stored on a
3 computer-readable storage medium for creating a compact visual
4 summary of video material, the computer-executable instructions
5 comprising the steps of:

6 receiving in a visual summary controller keyframes of said
7 video material;

8 extracting frame signatures from said keyframes;

9 using said frame signatures to create superhistograms from
10 said keyframes; and

11 using said frame signatures and said superhistograms to create
12 a compact visual summary of said video material.

1 31. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 30 further
3 comprising the step of:

4 filtering said keyframes received in said visual summary
5 controller; and

6 extracting frame signatures from said filtered keyframes
7 before using said frame signatures to create said superhistograms
8 to create a compact visual summary of said video material.

1 32. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 31 further
3 comprising the steps of:

4 using said histograms to cluster said filtered keyframes; and
5 adding a representative keyframe from said clustered keyframes
6 to said compact visual summary of said video material.

1 33. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 32 wherein the
3 distance measure for clustering is equal to a histogram difference
4 calculated by one of: L1 distance measure method, L2 distance
5 measure method, histogram intersection method, Chi Square test
6 method, and bin-wise histogram intersection method.

1 34. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 32 wherein
3 said visual summary controller is capable of selecting a
4 representative image for each of said superhistograms, wherein said
5 representative image is one of: the first image in each family
6 histogram, the most meaningful image in each superhistogram,
7 a randomly chosen image, and an image that is closest to the
8 cluster center.

1 35. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 34 further
3 comprising the step of:

4 selecting a family histogram to use to create said compact
5 visual summary of said video material.

1 36. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 30 further
3 comprising the steps of:

4 retrieving a compact visual summary stored in a memory unit;
5 and

6 causing said compact visual summary to be displayed in
7 response to a user request.

1 37. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 32 further
3 comprising the step of:

4 causing said visual summary controller to use said compact
5 visual summary to access at least one portion of said video
6 material.

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1 38. The computer-executable instructions stored on a
2 computer-readable storage medium as claimed in Claim 32 further
3 comprising the step of:
4 causing said visual summary controller to use said compact
5 visual summary to create new video material.

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